PART 121-3: LAND USE TRENDS AND FUTURE NEEDS

The physical pattern of development in Rhode Island is characterized by its extreme concentration of industry, commerce and residence into dense urban areas, and the reverse of this fact: large areas of partially used rural lands comprising almost two-thirds of the State's total area. ***—Rhode Island Development Council, 1955*** ((RI Development Council:18))

In the past 50 years Rhode Island's economy and land use have changed in fundamental ways. Recent patterns of land use illustrate shifts from factory-based employment centers to home offices, large industry to small business, big cities and farmland to suburbs and condos. But even in 1955 change was imminent: in "the present age of steam-electric power," planners recognized a decentralization of residential, commercial and industrial development was taking place, "due to increased mobility... [because] automobiles enable commuters to travel to and from any part of the state." In the future – "1955 and beyond, the atomic age" – this trend would continue, they said, "strengthened by improved highways, increasing urban property taxes, and by defense considerations... [There would be a] growth of population in urban fringes and in sparsely settled areas." ((RI Development Council:20))

As the Rhode Island Development Council realized, these shifts present opportunities as well as challenges. The greatest of these (and both an opportunity and a challenge) is to envision and implement development patterns and community design able to support the new economy without sacrificing the attributes that make our state unique. This is what the modern-day Rhode Island Economic Policy Council refers to when it mentions "succeeding without losing our soul." It is the essence of smart growth and good land use planning.

The strength of the state economy, specialized markets and the local economy determine the pace and direction of physical changes in Rhode Island. If we can maintain land use controls that preserve Rhode Island's livable, walkable cities, reasonable traffic flows, and sense of "community" and "place," then market forces will encourage development at the pace and in the direction we desire. Progress does not have to be based on what the Development Council called "decisions based on pressures of the moment," or what the Policy Council cited as "the creeping sameness that has sapped the vitality from other communities." Sense of place and quality of life are as important as access to the best universities and major markets in the Northeast, and Rhode Island has all of these.

In a world where companies and the talent that drives them can locate anywhere, quality of place is more important, not less important. Rhode Island has a rich mix of authentic places, which can be magnets for the talented workers who power the new economy. We must nurture and enhance this advantage. ***—Rhode Island Economic Policy Council, 2001*** ((Rhode Island Economic Policy Council:1))

3-1 Trends Affecting Land Use

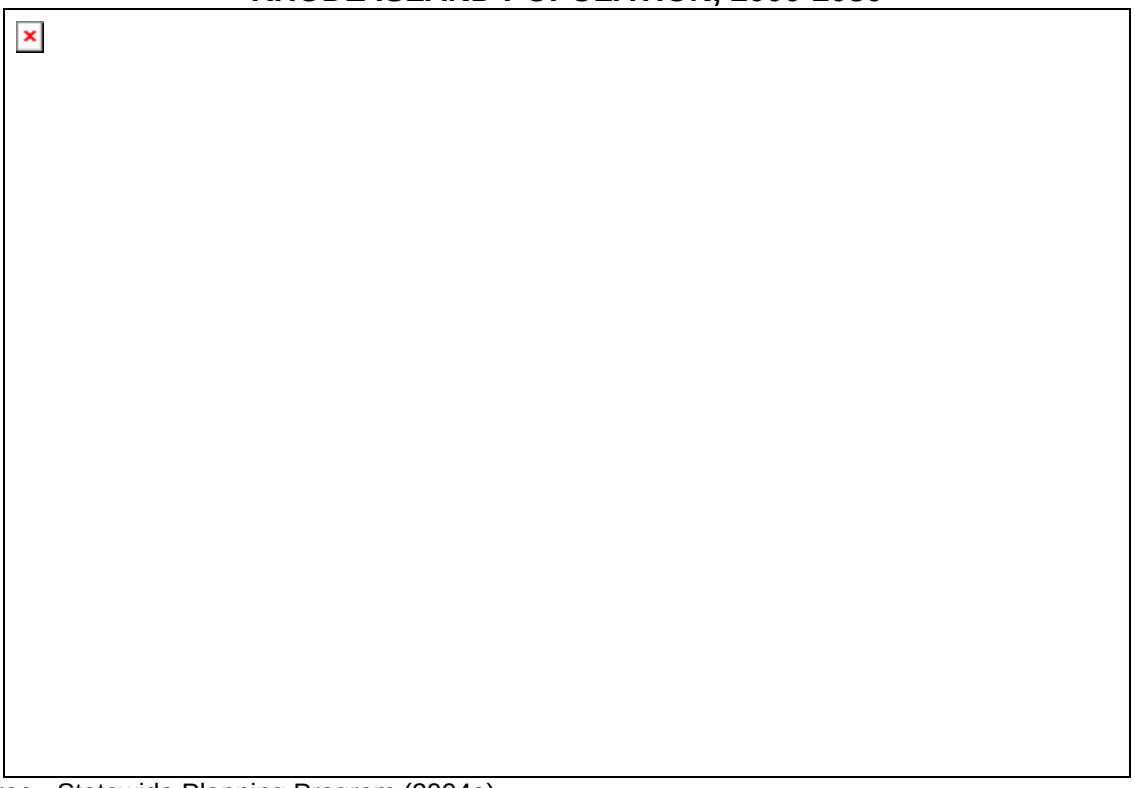
Census and other data have confirmed the trends foretold by the Development Council, with widespread ramifications for land use. These trends can be categorized as *demographic, economic,* or *environmental*.

Demographic Trends and Projections

Population numbers and trends are a critical consideration in land use planning. Population size and characteristics affect land use and natural resources in many ways, reflecting needs and market demands for housing, employment locations, and modes of transportation, along with recreation areas, schools, waste disposal, water supply and air quality. Household size and land consumption per household, two other important indicators, can change significantly with a diverse, decentralized, and mobile population.

Population growth in Rhode Island was 6 percent from 1970 to 1990, but 4.5 percent (44,855 persons) from 1990 to 2000. Statewide Planning's projections used in *Transportation 2025,* an element of the State Guide Plan, forecast a lower rate of growth, 8.8 percent, from 2000 to 2030 (Figure 121-03(1)). ((SPP, *Projections*:5; SPP, *Transportation 2025*:15))

Figure 121-03(1):
RHODE ISLAND POPULATION, 2000-2030



Source: Statewide Planning Program (2004a)

Statewide Planning has also projected changes in the age structure of the population: the working age group, 15-64 years of age, would increase from 613,000 in 2000 to 652,000 in 2015, and then decline to 622,000 in 2025; the school-age population would fall from 218,000 in 2000 to 200,000 in 2015, and then rebound to 212,000 in 2025; and the 65-and-over group would remain about level at approximately 150,000 until 2010, but then rise to a point exceeding 200,000 by 2025, a level 40 percent higher than in 2000 (see Figures 121-03(2) and 121-03(3)). ((SPP, *Pop. Projections*:10-15; SPP, *Transportation 2025*: 15))

The number of households has increased much faster than the population, these planners found, growing some 40 percent from 1970 to 2000. "As the population was spread out in a larger number of separate households," they noted, "average household size declined from 3.3 to 2.7 people." ((SPP, *Transportation 2025*:16))

Employment growth has also outpaced population, increasing 25 percent from 1970 to 2000. The planners attributed this to "higher labor force participation, especially by women." ((SPP, *Transportation 2025*:16))

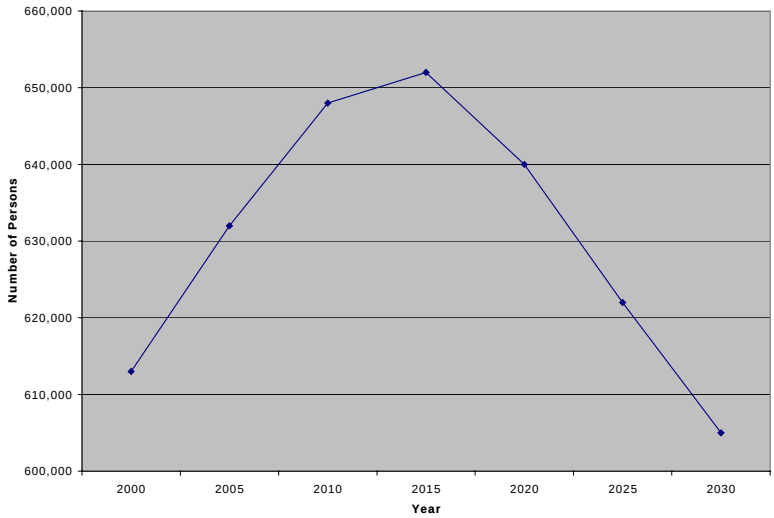
Trends toward decentralization and mobility are reflected in Census data showing changes in location of population and employment from 1990 to 2000. All but five Rhode Island cities and towns gained population, but the largest increases were in suburban/rural Washington ("South") County. The largest percentage gains in employment by place of work occurred outside the metropolitan core. In 2000, Rhode Islanders had an average commute to work of about 23.5 minutes, up from 19.2 in 1990. ((SPP, *Transportation 2025*:17-18))

Another report, *Ocean State Outdoors,* noted that the population growth rate for rural small towns, with fewer than 10,000 residents as of 1990, was more than three times higher than the growth rate for larger towns and cities. The percentage change in the Town of West Greenwich was highest at 45.6 percent, followed by Richmond (35 percent), Charlestown (21.3 percent), and New Shoreham (20.8 percent). The report observed that the "geographic decentralization of population throughout the 1980s and 1990s was a major dynamic affecting the open space and recreation resource base." ((SPP, *Ocean State Outdoors*))

However, Census 2000 also recorded population increases in three major urban communities, Providence, Pawtucket, and Central Falls. This was the second consecutive decennial census that witnessed population growth in those cities, after periods of population decline beginning in Providence and Central Falls in 1940 and Pawtucket in 1960. Most of the growth, nearly 14,500 residents, occurred between 1990 and 2000 ((SPP, *Census 2000: Rhode Island Demographics*)), and much of this increase was due to immigration.

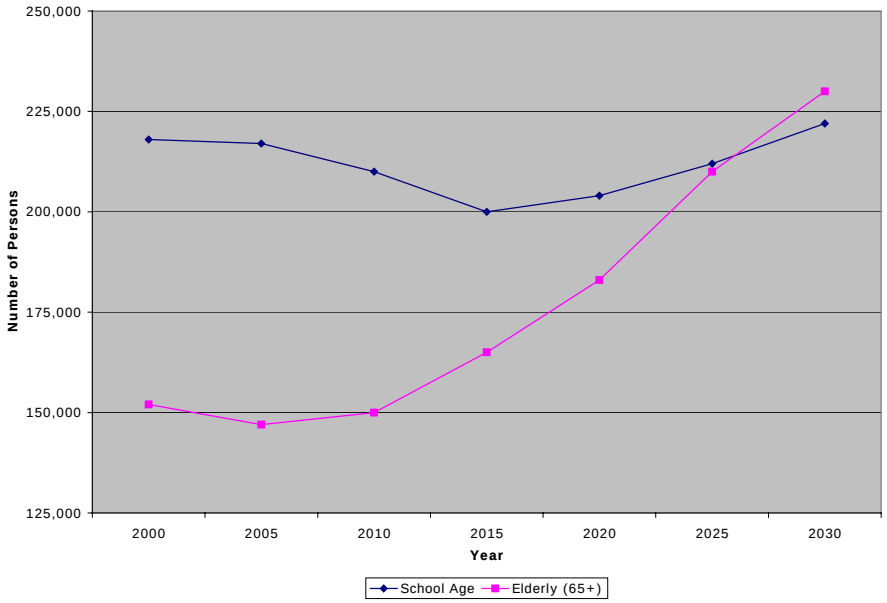
Immigration has had a statewide impact. Between 1990 and 2000, the state's population grew from 1,003,464 to 1,048,319 (44,855 persons). The in-migration of

Figure 121-03(2):
WORKING AGE POPULATION, 2000-2030



Source: Statewide Planning Program (2004a)

Figure 121-03(3):
SCHOOL AGE & ELDERLY (65+) POPULATION, 2000-2030



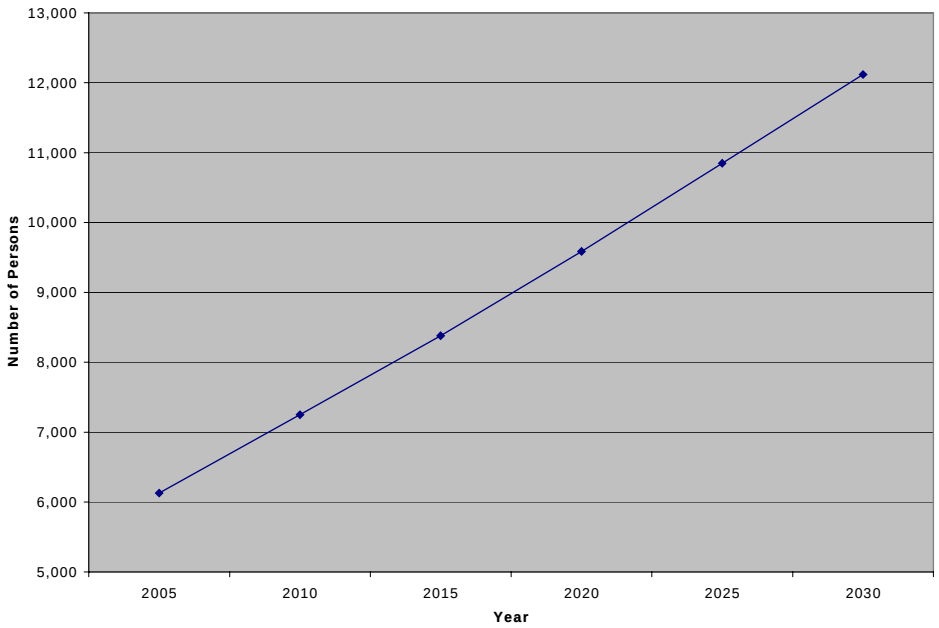
Source: Statewide Planning Program (2004a)

persons of Hispanic origin was particularly dramatic, and Rhode Island's Hispanic population by the end of the decade had essentially doubled. The Census data show that 80 percent of the increase occurred in the three above communities, Providence, Pawtucket, and Central Falls. ((SPP, *Census 2000*:3))

> An analyst from Statewide Planning reported to the Governor in 2001:
>
> There is no question that immigration has played, and continues to play, an important role in the continuing growth of the state and in the rebirth of some of Rhode Island's major cities... Without these new arrivals, Rhode Island's population growth [between 1990 and 2000] would have been reduced to less than 3,000. ((SPP, *Briefing*:11))

As Figure 121-03(4) shows, the importance of immigration is expected to continue.

Figure 121-03(4):
NET MIGRATION, 2005-2030



Source: Statewide Planning Program (2004a)

Economic Trends and Projections

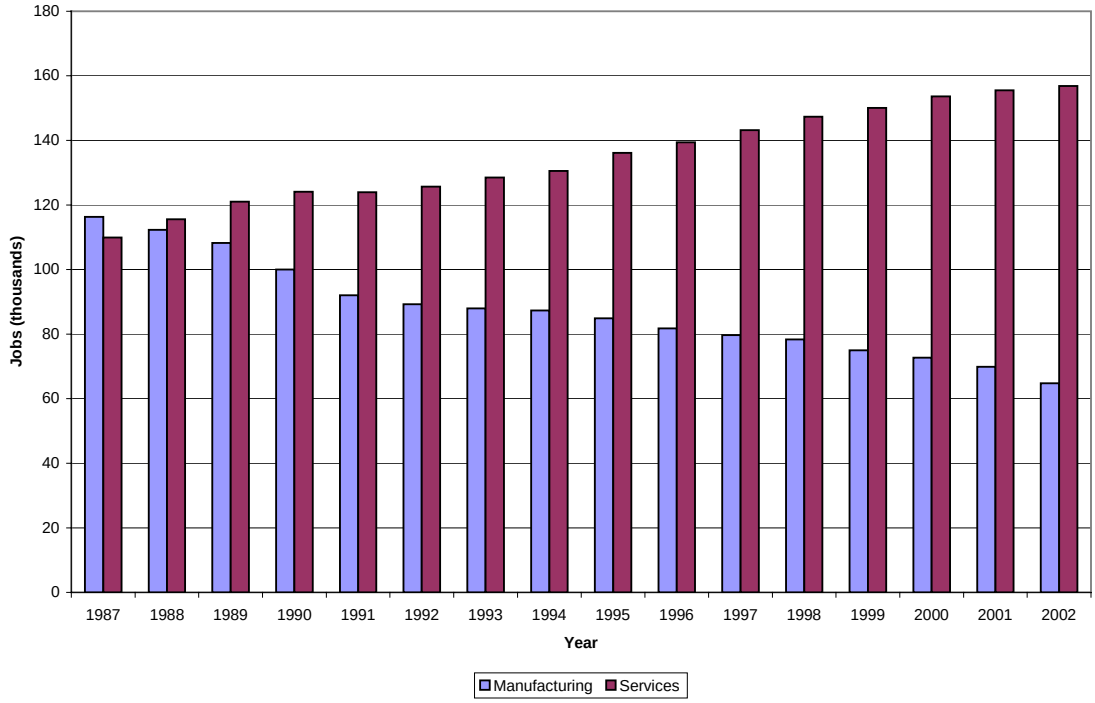
There have been major economic trends in the past 50 years that have also impacted land use. First and foremost has been the declining numbers of workers in Rhode Island's manufacturing sector, which in 1955 represented 42 percent of the labor force in the state (compared at the time to 25 percent nationally) and presently account for only 12.2 percent of the labor force (compared to 12 percent nationally). ((Economy.com, **www.economy.com**))

Second was the major reduction in military facilities and personnel in the early 1970s, which had profound effects on the state's economy, particularly in North Kingstown and Newport County, but also conveyed large tracts of land for industrial development.

Third, the state greatly expanded its service economy, with some distinctive strengths in tourism, health care, and post-secondary education. In 1988 services overtook manufacturing as the predominant sector of the economy (Figure 121-03(5)). ((RIDLT, *Labor Market Information*)) The service sector has been an important driver for preservation and redevelopment efforts that have revived and transformed the old seaport and industrial centers found in Providence, Newport, Bristol, and Westerly, with many other revitalization programs underway. Certain waterfront areas have local economies that are substantially supported by retirement communities and second homes.

Fourth is the advent of the so-called "new economy," complicated by its emphasis on entrepreneurship and decentralization in some sectors and regionalization in others. It is regional in the sense that nearly 15 percent of Rhode Island's workforce work in Massachusetts or Connecticut. ((Reference?)) It is decentralized in that several new economy companies can occupy a renovated mill building that formerly housed a single textile company, with each employing five people or fewer.

Figure 121-03(5):
ESTABLISHMENT EMPLOYMENT:
MANUFACTURING vs. SERVICES, 1987-2002



Source: RI Dept. of Labor and Training; aggregated by SIC (Standard Industrial Classification) Code

Those employed in the new economy may work in home offices or loft space as well as commercial, industrial, or mixed-use areas. "Production" is likely to be clean and compatible with non-industrial and non-commercial uses, with the worker living on the premises in some cases (artists' live/work spaces, for example). Traditional zoning designations continue to blur and grow obsolete.

In 2003, Rhode Island added 4,300 private and public sector jobs, with non-farm employers reporting an estimated 483,700 jobs.

Health care and social assistance employed 70,400 Rhode Islanders in 2003, and reported the strongest job growth among 16 North American Industry Classification System (NAICS) sectors surveyed by the R.I. Department of Labor and Training. Health care/social assistance employment has grown 26.8% since 1992, adding 14,900 jobs to the economy. The largest percentage growth in 2003, however, was in construction, which enjoyed a 7.2 percent increase. Manufacturing, in contrast, lost 3,400 jobs, a 5.5 percent decrease (Table 121-03(1)). ((RIDLT, *Year in Review*))

Table 121-03(1):
CHANGES IN EMPLOYMENT IN 16 INDUSTRY SECTORS

	2003 (in 000s)	2002 (in 000s)	Numerical change	Percent change
Total Nonfarm	**483.7**	**479.4**	**4,300**	**0.9%**
Natural Resources & Mining	0.2	0.2	0	0.0%
Construction	20.8	19.4	1,400	7.2%
Manufacturing	58.9	62.3	-3,400	5.5%
Wholesale Trade	16.4	16.5	-100	-0.6%
Retail Trade	53.1	53.1	0	0.0%
Transportation, Warehousing & Utilities	11.3	10.9	400	3.7%
Information	11.0	11.2	-200	-1.8%
Financial Activities	33.6	32.9	700	2.1%
Professional, Scientific & Tech. Services	19.2	19.0	200	1.1%
Administrative & Waste Services	22.6	23.2	-600	-2.6%
Educational Services	20.1	19.3	800	4.1%
Health Care & Social Assistance	70.4	68.8	1,600	2.3%
Arts, Entertainment & Recreation	7.3	7.1	200	2.8%
Accommodation & Food Services	42.0	40.9	1,100	2.7%
Other Services	22.9	22.0	900	4.1%
Government	66.5	66.1	400	0.6%

Source: RI Dept. of Labor and Training

The changes from 2002 to 2003 continue the contraction of the manufacturing sector and expansion of the service sector charted in Figure 121-03(5).

Planners can turn to historical data to discern trends among the six major industrial groups that are the biggest employers in the private sector and use them to forecast future employment patterns and attendant land use. From employment data gathered by the R.I. Department of Labor and Training (DLT), and projections from the DLT ((RIDLT, *Decade*:33)) and Statewide Planning ((SPP, *Industrial*:2.6)) subjected to regression analysis, Statewide Planning recently forecast growth in every sector but manufacturing out to 2030 (Table 121-03(2)).

Table 121-03(2):
EMPLOYMENT BY MAJOR SECTOR, 1980-2030

Year	Total	Contract Construction	Manufacturing	Transportation, Communication & Pub. Utilities	Wholesale & Retail Trade	Finance, Insurance & Real Estate	Services
1980	338,091	12,656	129,081	12,336	80,940	20,847	82,231
1990	383,289	18,754	100,040	15,501	98,096	26,831	124,067
2000	399,294	18,340	72,679	16,447	109,217	28,995	153,616
2010*	484,847	21,221	61,905	22,997	120,143	35,301	223,280
2020**	474,327	21,256	49,227	17,901	124,245	34,556	227,142
2030	528,179	24,346	23,234	22,624	139,125	40,072	278,778

*DLT projection for 2010

**SPP projection for 2020

Sources: RI Dept. of Labor and Training, Statewide Planning Program (2000c)

A critical component of land use trends is the significant shift from large, centralized employer firms to small businesses (defined as fewer than 500 employees). This affects both the new economy in the ways described above and Rhode Island's more traditional industries. There can now be a "downsizing" of what is considered an attractive industrial parcel, and several firms can be co-located in a space once designed for or occupied by a single factory.

The U.S. Small Business Administration (SBA) recently identified small business as "the engine of Rhode Island's economic performance." ((SBA:1)) Of the 32,594 employer firms active in the state in 2003, 96.4 percent (approximately 31,400) were small businesses. Self-employment accounted for another 32,384 businesses, an increase of more than 6,000 from the previous year.

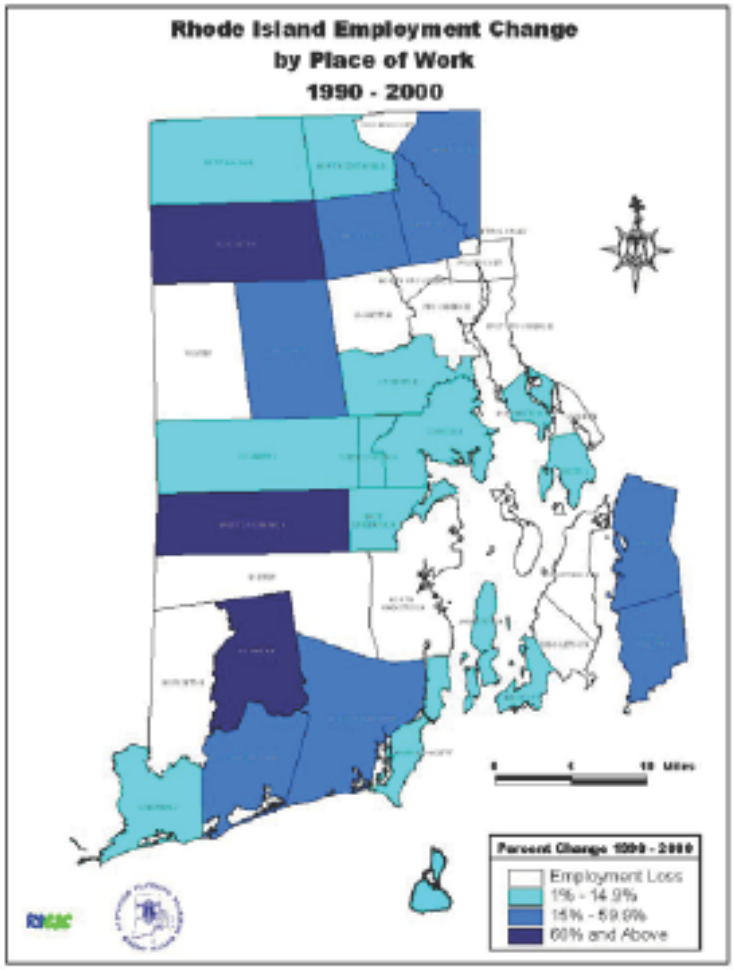
It is obvious that small business is here to stay: the SBA reported that small business proprietors' income now tops $2.3 billion, an increase of 6.4 percent from 2002 to 2003. Moreover, small businesses dominate all sectors of the economy, with most numbering fewer than 100 employees. In 2001, employer firms at this level represented 99 percent of all firms engaged in construction, and 90.6 percent of those in manufacturing; 89.5 percent of those in transportation and warehousing; 87.6 percent of

those in wholesale trade; 91.5 percent of those in retail trade; 89.3 percent of those in finance, insurance and real estate; and 94.5 percent of those in services. ((SBA:2))

In 2001, small businesses employed 58.3 percent of people working in Rhode Island. Firms with fewer than 100 employees employed about 41 percent, but within the small business total accounted for more than two out of three jobs. ((SBA:2))

Changes in location of employment in the last decade have also been significant. Employment by place of work continues to decentralize, with the largest gains (percentage-wise) outside the metropolitan core, with the cities of Providence, Pawtucket, East Providence and Central Falls and the towns of North Providence and Johnston actually losing jobs. This is shown in Map 121-03(1).

Map 121-03(1)
DECENTRALIZATION OF EMPLOYMENT IN RHODE ISLAND



Sources: US Bureau of the Census, RI Geographic Information System (RIGIS)

Environmental Trends

The conservation and protection of natural resources has a direct effect on land use patterns in Rhode Island. The state has excellent water resources, agricultural soils, a lengthy estuarine and ocean coast, many scenic areas, a reasonable climate, and abundant native vegetation and wildlife resources. Issues pertinent to natural resources overlap with general issues of community character; in fact, natural and scenic resources are a defining component of community character that can be negatively affected by development, which may not be sensitive to their importance.

Past increases in human population and development in Rhode Island have led to a degradation and fragmentation of natural habitats that serve as home for wildlife and sources of recreation for residents. Greenspace has disappeared as forests and fields have been converted into roads, parking lots, housing developments and strip malls. While the State Guide Plan, in the *Rhode Island Urban and Community Forest Plan,* calls for stemming the erosion of the state's tree cover, studies by the University of Rhode Island's Laboratory for Terrestrial Remote Sensing indicates that tree cover in the state is decreasing. ((Reference?))

Unfortunately, the unique and dynamic natural systems so important to Rhode Island do not conform to jurisdictional lines separating public property from private. Some private lands provide crucial habitat for endangered or threatened species and are an integral part of a healthy, biologically diverse ecosystem. These lands may provide migration corridors critical to the survival of some mammals. Other, more isolated private lands may provide critical reproductive habitat for species of special concern. Wetlands and migration routes occur independently of land ownership and property boundaries, and they cannot simply be moved to more convenient locations.

Many of the land development regulations in Rhode Island prior to 1989 did not directly address natural resource protection. One reason is that development often does not equate to *immediate* scenic and natural resource degradation, and development in Rhode Island is no exception. It is rare that one particular development will so obviously and immediately destroy an area of critical habitat or a scenic vista, but the effects of several developments in close proximity may well have a cumulative effect.

Developed, Undeveloped, and Protected Land

Rhode Island contains approximately 336,000 individual parcels, accounting for just under 700,000 acres. Nearly one third of the land is currently developed. About 70 percent (almost half a million acres) of land, wetland, and inland water remain undeveloped (see Table 121-03(3)). Map 121-03(2) (second page following) reports *developed land cover,* i.e., where land has been disturbed from its natural condition and developed for structures or impervious surface.

Of the 53 percent of the state's land that is undeveloped, about 11 percent (nearly 77,000 acres) is permanently protected as open space (Table 121-3(3)). Protections are also afforded wetlands and inland water, representing nearly 90,000 acres and 36,000 acres, respectively.

Protected land is but one of the environmental positives that have occurred within the last 50 years. There have been greenspace preservation efforts at the federal, state and municipal levels. The Governor's Growth Planning Council has promoted the concept of *growth centers* where development can be concentrated while other areas of the state are preserved for their natural resource values. The State Planning Council has adopted regulations allowing municipalities to designate growth centers through the comprehensive planning process. Urban sprawl has been recognized as undesirable, with alternative, higher density, mixed land use patterns gaining credence among some developers. Urban locations such as old mill buildings have become centers for the fine and performing arts, and other adaptive reuse. But development pressures continue.

Table 121-03(3):
LAND AND WATER AREA IN RHODE ISLAND

Type	Area (acres)		% Cover	
Developed land	205,239		29	
Undeveloped land	368,994		53	
Unprotected		*292,174*		*42*
Protected - open space		*76,820*		*11*
Wetland	89,588		13	
Inland water	35,900		5	
Total	699,721		100	

Source: Statewide Planning Program, RIGIS

Agricultural Resources

Farming is an annual $141 million business in Rhode Island. ((RIDEM reference?)) The rising costs of agricultural land tax rates, labor costs, and damage from vandalism have increased production costs, however. As it becomes more difficult to maintain a successful agricultural operation, farmland will be sold and converted to more intensive, and more urban land uses. The R.I. Department of Environmental Management believes that the dairy industry is most threatened at this time due to development pressure and low market prices for milk.

On the other hand, the number of farmers' markets throughout the country is growing dramatically, increasing 79 percent from 1994 to 2002. ((Reference?)) Farmers' markets in Rhode Island could become an integral part of an urban-farm linkage, as consumer interest in obtaining fresh products directly from the farm increases. Farmers' markets are meeting the needs of a growing number of farmers with small- to medium-size operations within the state. ((Reference?))

Map 121-03(2):
DEVELOPED LAND COVER IN RHODE ISLAND

As of early 2004, 4,312.5 acres were under the protection of the state's agricultural land preservation program. ((RIDEM))

Coastal Resources

It can be argued that the single most prominent natural feature in Rhode Island requiring our attention is Narragansett Bay. The quality of the water has been degraded over the years by point source discharges, combined storm water overflows, and silt and runoff from paved surfaces. Its floodplain has been altered and encroached upon by surrounding land uses, and public access to the bay is often cut off by development.

Narragansett Bay is a nationally significant estuary. The bay watershed is more than ten times larger than the surface area of the bay and is one of the most densely populated estuary systems in the United States. ((SPP, *CCMP Exec Summ*:xx))

Maritime commerce was Rhode Island's first major commercial enterprise and remains extremely important today. A 17-mile-long, 40-foot-deep channel extends from the southeast side of Prudence Island to the port of Providence. The port is a major importer of petroleum products and exporter of scrap metal. The bay's industrial and manufacturing core coincides with the major urban areas in the Blackstone-Providence and Taunton River basins. Dredging operations are currently (2004) underway to maintain the Providence channel at its federally mandated 40-foot depth.

Ports around the bay serve various venues. Ports of Providence, Quonset-Davisville, Newport, Point Judith, Bristol and others serve commerce, fishing and recreation. Waterfront commerce in Fall River and other Massachusetts centers on the Taunton River/Mount Hope Bay branch is accessed through Rhode Island waters and roadways. Landside support for the various uses of the bay affect use patterns in urban and village areas.

Shellfishing is an important industry in the bay, but areas of the Upper Bay are closed to fishermen because of pollution from combined sewer overflows (CSOs). The Narragansett Bay Commission is in the process of replacing the outdated CSO system, which for years allowed sewage to dump directly into the bay during severe rainstorms. Other areas of closure periodically include Greenwich Bay, which has had to deal with failing septic systems and resultant fish kills, and Mount Hope Bay. These are consequences of population growth along Narragansett Bay and its various branches.

Urbanization, particularly along the barrier beaches of Block Island Sound and the coastal ponds, in the past caused considerable modification of the coastline of the state. While these resources are now afforded some protection, the movement of population away from urban centers to these attractive coastal and inland rural communities poses additional threats of pollution, beach erosion, and loss of natural features that can mitigate the worst effects of coastal storms.

Wetlands

Urbanization, particularly along major river systems, has caused considerable modification of Rhode Island's wetlands. Historic losses can be attributed predominantly to population growth, transportation projects and residential development. Although a "no net loss" policy is in place, the state's wetlands resources – important in controlling runoff, retaining water during dry periods, and acting as barriers to storms and floods along the coast – continue to be threatened by the movement of population away from urban centers and toward coastal and rural communities. In 2001, the Department of Environmental Management reported unauthorized alterations of 17.4 acres of wetlands, rivers and streams. ((Reference?))

The restoration of degraded wetlands has become an important goal for Rhode Island. The State Guide Plan, in *A Greener Path: Greenspace and Greenways for Rhode Island's Future,* called for restoring 100 acres of wetlands per year. In addition, a Coastal Habitat Restoration and Trust Fund has been established to restore salt marshes, eelgrass beds and fish runs. This will be combined with numerous other efforts led by the Rhode Island Cooperative Wetlands Restoration Project, the Narragansett Bay Estuary Program, and local watershed groups.

The "Vulnerable" Landscape

Statewide Planning's mapping analysis found 42 percent of Rhode Island is currently neither developed nor protected as wetlands, inland water or open space. The undeveloped and unprotected land was reported as 292,124 acres (Table 121-03(3)).

3-2 Land Use Trends: 1970-1995

The Statewide Planning Program has tracked and analyzed Rhode Island's land use for decades and, in a series of reports, has reported 12 important growth and development trends. Analysis of the 1995 land use data reinforces our findings for each of these trends, observable since 1961:

- Population has increased at a slow rate but the rate of household formation has increased much faster.
- Rhode Island has become more developed.
- Development has increased nine times faster than population.
- The *largest* source of development is residential land use.
- Population has migrated toward the rural parts of the state.
- Employment centers have expanded away from central cities.
- Industrial land use has increased and moved farther into the suburbs.
- The *most visible* source of development has been commercial land use.
- The amount of land dedicated to transportation increased.
- Agricultural use of land has been in long-term decline.
- Protection of undeveloped land has increased.

- The state is increasingly urban, but there is a qualitative difference between the traditional central cities and the newly urbanized suburbs.

Rhode Island conducted major land use/land cover surveys in 1961, 1970, 1988, and 1995. The data on a statewide level were grouped into 16 categories for purposes of comparison over the years. Table 121-03(4) summarizes land use, in decreasing proportions of total land, in 1995.

Trend 1: Population has increased at a slow rate but the rate of household formation has increased much faster.

Rhode Island's population increased an average of 14 percent per decade from 1900 to 1970. Since then the rate of growth has been much less, at one point the population decreasing and then rebounding, for an overall increase from 1970 to 2000 of 10.4 percent. Relatively low population growth is a trend anticipated to continue into the foreseeable future.

During the same period that the state had only a modest increase in total population, it also experienced a rapid increase in the rate of household creation (see Table 121-03(5)). Households have become smaller than ever before. The number of persons per household has been declining steadily since the 1950s due to lifestyle changes, declining fertility rates, an increase in the number of single-parent households, greater longevity of the population, and a general increase in single-person households. The simple equation is that total households will increase at a faster rate of growth than total population if the average household size declines. The significance of this will be examined in Trends 3 and 4.

In the ten years 1990 to 2000, population density increased statewide by 42.9 persons per square mile, from 960 to 1,003. The most significant density increases were in Central Falls, an increase of 1,067, and Providence, an increase of 698. Both cities now have population densities of 15,643 and 9,400 persons per square mile respectively.

Trend 2: Rhode Island has become more developed.

An examination of the land use surveys conducted in 1970, 1988, and 1995 shows that, during this period, the portion of Rhode Island's land area in developed uses increased from approximately 143,000 to 211,000 acres – more than 67,000 acres, an area equal to South Kingstown and Hopkinton combined, or 47 percent. The total acreage of major land uses is shown in Table 121-03(6), second page following. ((SPP, *Land Use 1961-1988*))

While developed land increased by 47 percent from 1970 to 1995, state population increased by only eight percent over the same period. The implications of this are quite significant.

Table 121-03(4):
LAND USE, 1995

Ranking	Land Use /Cover Type	Total Acres*	% of Total Land
1	Forest**	301,026	43.6
2	Residential	138,632	20.0
3	Wetland	89,595	13.0
4	Agricultural	49,094	7.1
5	Water	27,640	4.0
6	Open Land	14,299	2.0
7	Commercial	13,224	1.9
8	Developed Recreation	11,038	1.6
9	Institutional & Cemeteries	10,665	1.5
10	Industrial	8,588	1.2
11	Transportation & Utilities	6,847	1.0
12	Roads	6,518	0.9
13	Quarries & Gravel Pits	5,363	0.8
14	Urban Vacant	4,388	0.6
15	Waste Disposal	2,795	0.4
16	Mixed Commercial & Industrial	1,501	0.2

* Total acres in the state = 691,212
** Forest is defined by canopy, not by forest ecosystem

Source: Statewide Planning Program

Table 121-03(5):
POPULATION AND HOUSEHOLD GROWTH RATES, 1970-2000

	1970	1980	1990	2000	Change, '70-'80	Change, '80-'90	Change, '90-00	Change, '70-00
Population	949,723	947,154	1,003,464	1,048,319	-0.3%	6%	4.5%	10.4%
Households	291,965	338,590	377,977	408,424	16%	12%	8.1%	39.9%

Source: US Bureau of the Census

Table 121-03(6):
LAND USE COMPARISON: 1970, 1988 AND 1995

LAND USE/TYPE	**1970**	**1970**	**1988**	**1988**	**1995**	**1995**	**Change '70-'95**
	(In acres)	(By %)	(In acres)	(By %)	(In acres)	(By %)	(By %)
Residential	89,142	*12.8*	129,002	*18.7*	138,632	*20.0*	+55.5
Commercial	7,050	*1.0*	12,553	*1.8*	13,224	*1.9*	+87.6
Industrial	5,344	*0.8*	7,231	*1.0*	8,588	*1.2*	+60.7
Comm./Ind. Mixed	n/a	*n/a*	1,427	*0.2*	1,501	*0.2*	+5.2
Roads[1]	5,483	*0.8*	6,277	*0.9*	6,518	*0.9*	+18.9
Transportation & Utilities[2]	6,414	*1.0*	6,826	*1.0*	6,847	*1.0*	+6.7
Developed Recreation[3]	9,624	*1.4*	12,276	*1.8*	12,447	*1.8*	+29.3
Institutions & Cemeteries	10,012	*1.4*	11,374	*1.6*	10,665	*1.5*	+6.5
Urban Vacant[4]	5,780	*0.8*	5,679	*0.8*	4,388	*0.6*	-24.0
Gravel Pits & Quarries	3,328	*0.5*	5,378	*0.8*	5,363	*0.8*	+61.1
Waste Disposal	1,380	*0.2*	2,611	*0.4*	2,795	*0.4*	+102
Total Developed	**143,557**	***20.7***	**200,634**	***29.0***	**210,968**	***30.5***	**+47.0**
Forest	410,640	*59.2*	310,856	*44.9*	301,026	*43.6*	-26.7
Agriculture	62,120	*9.0*	50,583	*7.3*	49,094	*7.1*	-21.0
Barren, Brush, Wetlands, Water, Other Undeveloped[5]	77,643	*11.1*	129,519	*18.8*	130,124	*18.8*	
Total Undeveloped	**550,403**	***79.3***	**490,958**	***71.0***	**480,244**	***69.5***	**-12.8**
Total State Acres	**693,960**		**691,610**		**691,212**		

Trend 3: Development has increased nine times faster than population.

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[1] Defined as divided highways with 200 feet or more of right-of-way for 1970 and as divided highways with 100 feet or more of right-of-way for 1988 and 1995.

[2] The 1970 total includes airports, railroads, terminal facilities for truck freight, land based facilities for water transportation and fishing, and power lines. The 1988 and 1995 totals includes airports, railroads, water & sewer treatment facilities, water-based transportation facilities, and power lines with rights-of-way of at least 100 feet.

[3] Includes water based, participation, environmental, and spectator recreation from the 1970 study, and developed recreation (land use code 161) and beaches (land use code 710) from the 1988 and 1995 studies.

[4] Total of urban vacant land (land use code 162) and urban open transitional land (land use code 750).

[5] Includes abandoned orchards and fields, sandy non-beach areas, and heath covered land from the 1970 study, and brushland (land use code 400), sandy non-beach areas (land use code 720), and rock outcrops (land use code 730) from the 1988 and 1995 studies. Brushland areas were included in the forest category in the 1970 study.

Source: Statewide Planning Program (1988, 1999, 2000c)

Science has long recognized that land has a certain *carrying capacity.* Carrying capacity was originally defined as the largest number of any given species that a habitat can support indefinitely. When the carrying capacity is exceeded, the species population either crashes or expands into new regions. Urban planners have adapted the concept of carrying capacity to include the ability of natural and human-engineered systems to absorb population growth or physical development without significant degradation or breakdown. ((Sierra Club))

Rhode Island contains approximately 691,000 acres of land and water, and each resident requires a certain amount of these resources for his or her very existence. We use land to build our homes, to purchase goods and services, to earn our living, to enjoy recreation, to dispose of our wastes, and to provide food and water. The acceleration of development over population growth, if continued, means that the state's carrying capacity will be reached much sooner than would be expected by population growth alone.

Figure 121-03(6) displays the data presented above in terms of percent change of developed area per Rhode Islander. Note that developed square feet per person continued to increase despite slow or even negative population growth.

Trend 4: The largest source of development is residential land use.

Between 1970 and 1995, the state added *two* units of housing for every *one* new addition to the population! During this period, land in residential use increased 55 percent. There are clear patterns related to this phenomenon:

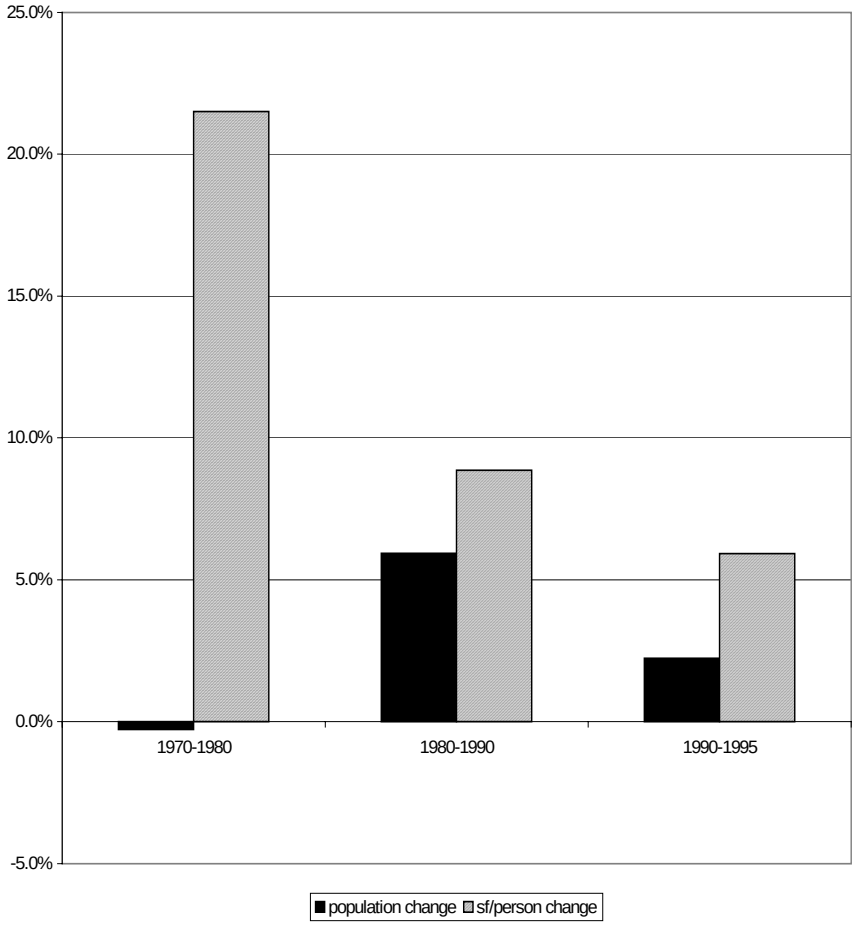
- The movement toward smaller households translated into greater demand for separate housing units.
- The demand, on average, was for single-family houses on relatively larger house lots, which meant more land consumed per new house.

This combination of smaller (i.e., more) households plus larger house lots is significant, particularly as it grew from the trend toward suburbanization of formerly rural areas (see Trend 5 below). The building boom of the mid-1980s undoubtedly accelerated this trend.

There has also been a secondary effect of businesses building near the new population centers. As people move into previously undeveloped areas, businesses soon follow to provide convenient locations to meet the demand for various goods and services. The resulting effect on land use is quite clear, as is shown in Figure 121-03(7). ((SPP, *Land Use 1961-1988*)), ((SPP, *Analysis*)), ((SPP, *Analysis 2000*))

The figure shows that the increase in land consumed for new commercial and industrial use in this period was also dramatic. Commercial land use virtually doubled, occupying 7,050 acres in 1970 and 13,224 acres in 1995. Industrial land use increased

Figure 121-03(6):
PERCENT CHANGE IN POPULATION AND DEVELOPED AREA PER PERSON, 1970-1995



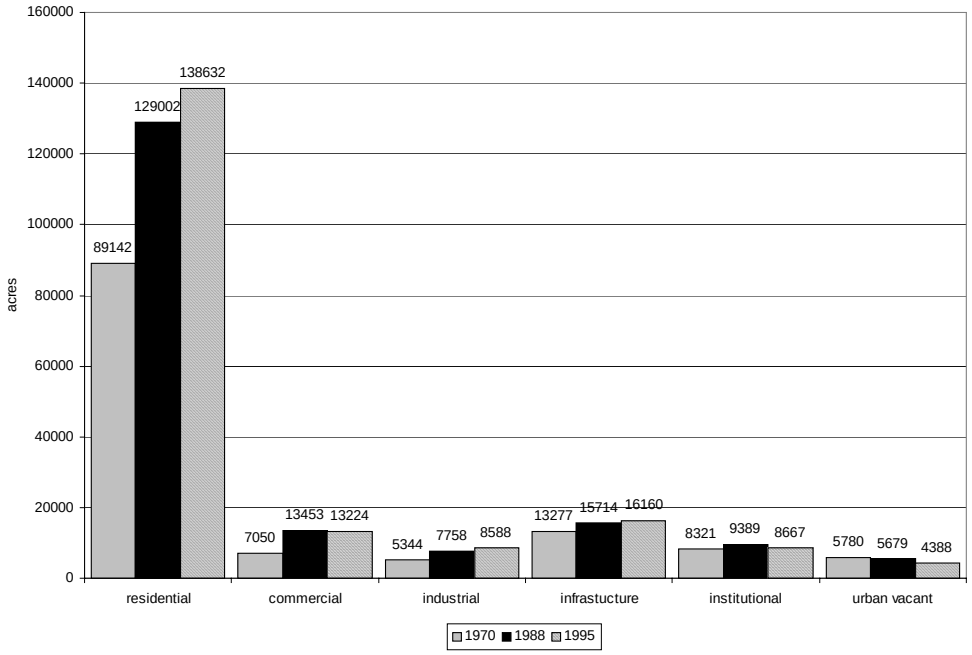
Sources: US Bureau of the Census, Statewide Planning Program (1999, 2000c)

by approximately 72 percent, from 5,344 acres in 1970 to 8,588 acres in 1995. ((SPP, *Land Use 1961-1988*)), ((SPP, *Analysis*))

Trend 5: Population has migrated toward the rural parts of the state.

Population shifts document the suburbanization of formerly rural areas and the trend of migration from older central cities that first began in the 1940s. The urban population decline in Rhode Island would have been even more notable if not for the offsetting increase in the population of Newport that continued until the closure of several Navy properties on Aquidneck Island in the 1970s. While the 2000 Census showed a reversal of this decline in Providence, Pawtucket, and Central Falls, the trend toward more rural areas was a characteristic of land use in the latter half of the twentieth century reaching well beyond 2000.

Figure 121-03(7):
DEVELOPED LAND USE TRENDS, 1970-1995



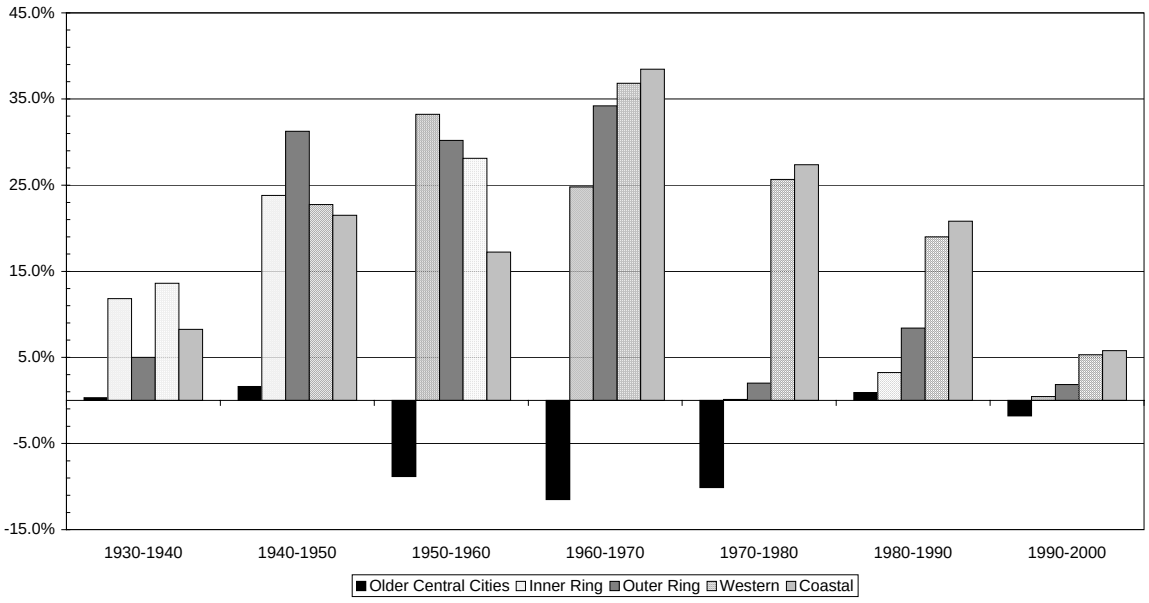
Source: Statewide Planning Program (1988, 1999, 2000c)

As city residents dispersed to suburbs and new residents moved into the state, the patterns of housing changed. Historically, housing had been densest in the communities of Central Falls, Pawtucket, Providence, and Woonsocket. Proportionally fewer multifamily housing units were constructed in the suburbs, and the relatively inexpensive price of land enabled single-family homes to be constructed on larger lots than in the central cities.

Statewide Planning's *Analysis of Rhode Island Land Use* (1999) charted population growth in distinct areas *(spatial zones)* of the state: the "older central cities," the "inner ring," the "outer ring," and "western" and "coastal" communities.

The older central cities, as can be inferred from the previous discussion, were Central Falls, Newport, Pawtucket, Providence, and Woonsocket. The inner ring consisted of Cranston, East Providence, Johnston, Lincoln, Middletown, North Providence, and Warwick, and the outer ring of Barrington, Bristol, Cumberland, East Greenwich, North Kingstown, North Smithfield, Portsmouth, Smithfield, Tiverton, Warren, and West Warwick. Burrillville, Coventry, Exeter, Foster, Glocester, Hopkinton, Richmond, Scituate, and West Greenwich comprised the western communities, while the coastal communities were Charlestown, Jamestown, Little Compton, Narragansett, New Shoreham, South Kingstown, and Westerly. ((SPP, *Analysis*:13)) Figure 121-03(8) tells the story.

Figure 121-03(8):
POPULATION GROWTH BY SPATIAL ZONE, 1930 - 2000



Sources: US Bureau of the Census, Statewide Planning Program (2000c)

Trend 6: Employment centers are expanding away from central cities.

While population was increasing by only eight percent between 1970 and 1995, industrial land use increased by about 72 percent and commercial land use almost doubled. Between 1970 and 1995, growth in employment was greatest in the inner ring communities, with 44,410 new jobs. Coastal communities increased by a greater *percentage* of increase, but this is probably due to the relatively low number of jobs in the base year, 1970 (Figure 121-03(9)).

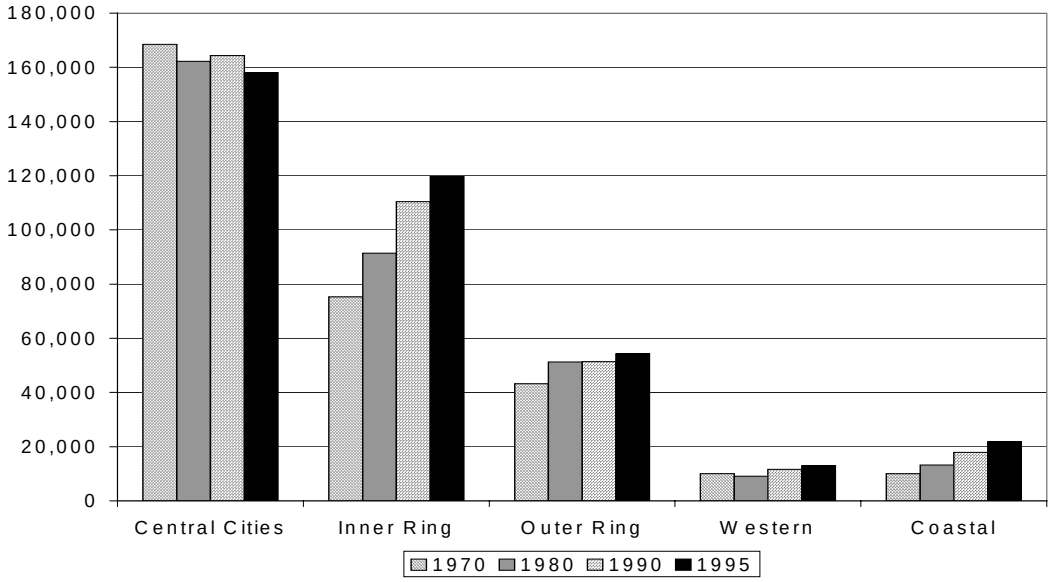
Trend 7: Industrial land use has increased and moved farther into the suburbs.

From 4,102 acres in 1961 to 11,106 acres in 1997, industrial land use in Rhode Island increased by 170.7 percent – in spite of fewer people working in manufacturing, the state's traditional industrial base. ((URI, *Remote Sensing*)), ((SPP, *Industrial*))

Good access to transportation, availability of utilities, access to the labor force, and limited or no physiographic or environmental constraints made many of the new sites truly "prime" and construction-ready.

A variety of evolving circumstances, starting around 1930, led to the relocation of industry from riverfront sites in the old manufacturing centers to the surrounding

Figure 121-03(9):
RHODE ISLAND EMPLOYMENT BY SPATIAL ZONE, 1970-1995



Source: Statewide Planning Program (2000c)

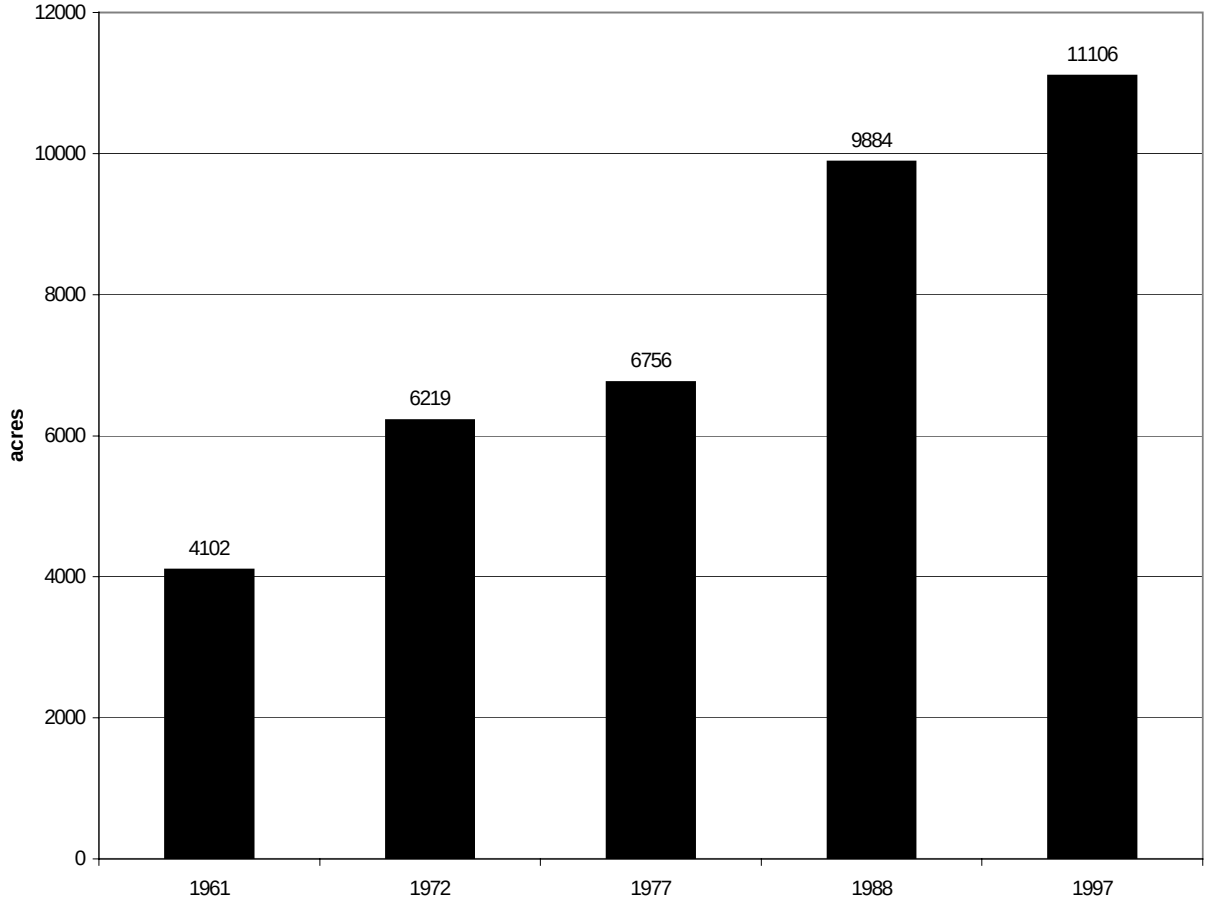
countryside. Power and water became available in more areas than ever as public infrastructure was extended. Highways provided an alternative to inner-city traffic. As population increased in suburban areas, so did the availability of labor. New construction on undeveloped sites was frequently more economical and easier to permit than rehabilitating and renovating existing facilities, the layout of which was becoming increasingly obsolete for modern production. Moreover, the very nature of what is "industrial" was changing with technology and shifting economic forces.

It is important to note that a considerable amount of the land zoned for industrial use that has remained vacant has significant constraints due to environmental factors and/or the lack of public water or sewers.

It is improbable that all remaining industrial-zoned land will actually be developed for industrial uses. Statewide Planning's *Industrial Land Use Plan* (2000) reviewed the properties in each Rhode Island community that remain available for industrial development and came to the same conclusion. Rezoning to free the land for other purposes was recommended in many cases due to development constraints and encroaching non-industrial uses. ((SPP, *Industrial*))

Increases in industrial land use in Rhode Island are charted in Figure 121-03(10).

Figure 121-03(10):
INDUSTRIAL LAND USE, 1961-1997



Sources: URI Cooperative Extension Service, Statewide Planning Program (1998, 2000c)

To spur large-scale commercial and industrial redevelopment, primarily in older central cities, Rhode Island enacted a law in 1995 to encourage reuse of *brownfields*. The U.S. Environmental Protection Agency (EPA) defines brownfields as "real property, the expansion, redevelopment or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant or contaminant." In Rhode Island, brownfields are abandoned or underutilized industrial sites that are often strategically located near population centers and transportation hubs.

For decades, brownfields were unattractive to developers because of cleanup costs and uncertainty about future environmental liabilities. The brownfields law addresses those concerns, and programs managed by the EPA, the R.I. Department of Environmental Management and the R.I. Economic Development Corporation can assess the extent of the pollution and provide funds or tax credits for cleanup. In addition, there are state tax credits available for renovating properties listed on the National Register of Historic Places (as some brownfields are) and eligible mill

buildings. ((RIEDC, *Reinvesting*)) The state also recently revised its building codes to encourage the reuse of older buildings.

The results so far are encouraging. Since 1995, over 767 acres of contaminated property have been restored, over $72 million worth of property has been brought back to the tax rolls, nearly 1,000 workers are employed on the restored properties, and 79 legal agreements on liability protection have been reached. ((RIEDC, *Reinvesting*))

Many brownfields are situated on prime industrial land, and their redevelopment can help revitalize surrounding neighborhoods. Redevelopment of brownfields also presents an alternative to developing new industrial sites in rural areas *(greenfields)*.

Trend 8: The most visible source of development is commercial land use.

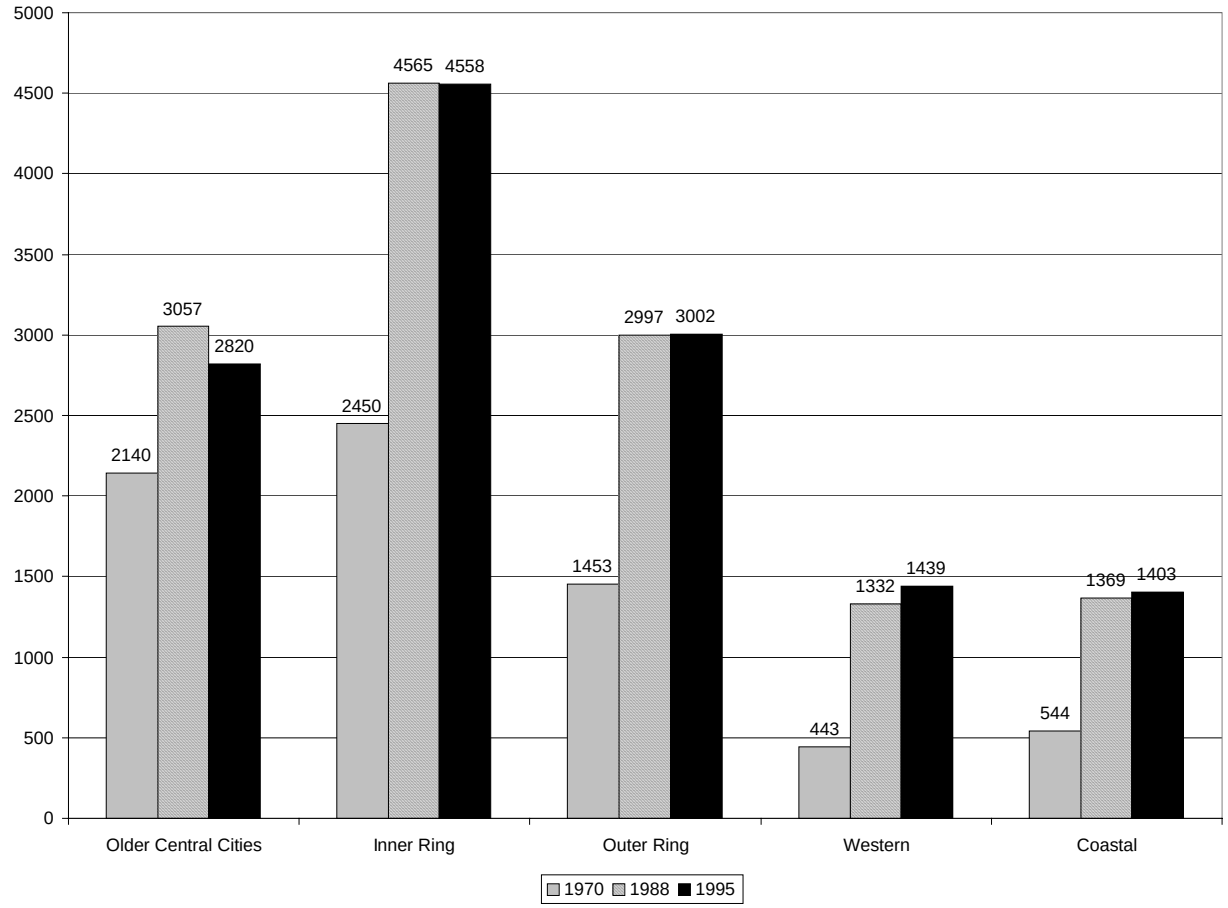
Unlike residential property, commercial land concentrates along the most heavily traveled roadways. The 1970 Rhode Island land use survey subdivided commercial land classifications to include strip development along roadways and shopping centers away from the urban core. *Almost 60 percent of commercial development fell into one of these two land use patterns.* It is this pattern of strip development that most people readily identify as "sprawl" and find unattractive aesthetically. In this sense, commercial land development has a disproportionate effect on people's perceptions.

As indicated previously, from 1970 to 1995 growth in commercial land use exceeded growth in residential land use in percentage terms, 55.5 percent compared to 100 percent. During the 1970s and 1980s the amount of land used for commercial purposes increased dramatically, particularly in the inner and outer ring suburbs although the older central cities experienced growth as well (see Figure 121-03(11)). ((SPP, *Land Use 1961-1988*)), ((SPP, *Analysis*:26-27)) It seems that as population spread into less developed parts of the state, critical densities were reached that provided opportunities for businesses to serve this population and to draw upon them as a labor force.

For the purposes of this analysis, commercial land is treated as a single category. In fact, there is more than one type of commercial land. One major division within commercial land is between office use and retail use. While not significant in terms of statewide land use, at a local level the difference in services needed and traffic patterns generated can be quite significant.

An important consideration in land use planning today is that the distinction between the traditional land use categories of manufacturing and commercial are changing as the activities, technologies and potential environmental impacts have changed. Also, the category "mixed-use" can mean many combinations of uses.

Figure 121-03(11):
COMMERCIAL LAND USE BY SPATIAL ZONE, 1970-1995



Sources: URI Cooperative Extension Service, Statewide Planning Program (2000c)

Trend 9: The amount of land dedicated to transportation increased.

There is a profound connection between transportation and land use. How a society chooses to develop its land – residential densities, the degree of land use mixing, site designs, the location of residential areas with respect to job centers, etc. – factors into the type of transportation system that can be used. For example, a highly dense, compactly developed area can readily use mass transit systems, while a low-density, highly dispersed development pattern requires automobiles.

The out-migration from the cities, largely enabled by the automobile, has changed the map of Rhode Island in more than one way. The population shift toward suburban and rural municipalities resulted in significant growth in many individual

communities. Roads that were originally designed for light amounts of local traffic soon exceeded their capacity. As seen from the previous discussion, commercial enterprises followed the populations moving to suburban and rural communities. Roads became commercial strips for retail businesses. Successful suburban businesses became new trip-generators, adding to the pressure for new and/or improved roads.

The most rapid increase in road construction in Rhode Island occurred from the mid-1950s to the mid-1980s. Construction of the three Interstate highways I-95, I-195, and I-295 was completed by 1975. The Interstates accounted for only 72 miles of the approximately 5,200 miles of public roads in 1975. The remainder was divided between state and local roads. Much of the increase in road mileage between 1962 and 1985 is attributable to newly opened residential neighborhood streets.

The state road network currently consists of approximately 6,000 miles, made up of the 72 miles of Interstates, 1,200 miles of state roads, and a network of local streets totaling 4,700 miles.

The era of major highway building in Rhode Island may have ended. Although there will certainly be improvement projects for problem areas and possibly a widening of some Interstate segments within the next 20 years, there are no plans for new state or Interstate roadways.

Large commercial and industrial enterprises usually seek easy access to highways, especially Interstates. Even without a demand for new Interstates, there can still be pressure for Interstate access either through upgraded state roads or new Interstate access ramps. And even if road miles hold essentially steady, certain projects could still deeply impact land use and transportation patterns.

Public transportation planning considers service to workers accessing jobs. A vital public transit system must serve the labor needs of the state in a population where an average 11 percent of the population (23 percent in Providence) do not own a vehicle. ((SPP, *Trans. 2025*))

Trend 10: Agricultural use of land is in long-term decline.

The overall acreage of land dedicated to agricultural use has been in steady decline since the 1800s. With Rhode Island's relatively poor agricultural soils and harsh climate, and with the advent of widespread rail and highway systems, it became more cost-efficient to import agricultural products from other regions of the country than to grow them locally.

Contrary to popular conception, at least in Rhode Island, the trend toward suburbanization through and including the post-World War II years did *not* accelerate the decline in active farmland. This period was characterized by abandoned farmland reverting to meadows, and then to forests. In fact, from the late 1800s to the 1950s the state's total area of forestland more than doubled.

More recent suburbanization did halt *this* trend. Since the 1950s much formerly agricultural land has been developed. Theoretically, inactive farmland is still available for agriculture at some future time. Development precludes this option.

Beginning in the mid-1980s, the state began initiatives to preserve farmland. One program is the Farmland Preservation Act, which established a program for the state to purchase development rights to agricultural land. Another program is the Farm, Forest, and Open Space Act, which allows municipalities to assess farmland at a lower tax rate. There are indications, as reported by the RIDEM Division of Agriculture, that the trend of diminishing active farmland has itself diminished and possibly even reversed in recent years. ((Reference?))

Trend 11: Protection of undeveloped land has increased.

While the amount of undeveloped land has decreased, permanently preserved open space has increased due to an aggressive campaign of local, state and federal initiatives. Rhode Island has nearly 50 non-profit land trusts and conservation organizations that are active in the protection of open space in their own right, and also work in partnership with government agencies and other organizations.

These lands, often referred to as *greenspace* areas, comprise between 100,000 to 120,000 acres, or approximately 14.5 to 17 percent of the state. ((RIDOP, *Recreation Inventory*)) These ranges are given because it is difficult to determine a precise acreage count as ownership of protected land is scattered among so many different entities. Reported acreages also vary depending on whether waterbodies are counted as part of a protected parcel or factored out.

The vast majority of open and undeveloped land remains in private ownership and is potentially subject to development.

Trend 12: The state is increasingly urban, but there is a qualitative difference between the traditional central cities and the newly urbanized suburbs.

The first urban population centers grew around Newport and Providence. The rise of the Industrial Revolution fostered the growth of new urban communities, such as Pawtucket, Central Falls, and Woonsocket along the Blackstone River.

Five of Rhode Island's urban municipalities may be considered "old" or traditional central cities: Providence, Pawtucket, Central Falls, Newport, and Woonsocket. Cranston, East Providence, North Providence, Warwick, and West Warwick are the new urbanized suburbs.

How do they differ?

Our traditional cities were designed with high density in mind from their inception. Businesses and residences are found in near proximity. Lot sizes are relatively small and multi-family housing relatively abundant. Mass transit is widely available and sidewalks are everywhere. Public infrastructure such as water and sewers extend into almost all neighborhoods. Neighborhoods have readily defined character and boundaries.

In contrast, suburbs were designed with low density in mind. Housing and businesses are segregated. Lot sizes are relatively large and multi-family housing relatively scarce. Due to the low-density, scattered patterns of housing, mass transit is mostly impractical. Since residences and businesses are not generally within walking distance, few sidewalks are needed. While some infrastructure such as public water is fairly common, other infrastructure such as sewers may be widely scattered. Neighborhood boundaries are generally ill defined.

Overall we can characterize the trend for the past 50 years as one of urban decline and suburban expansion. Where people are living and how they are using land has been changing dramatically. People are living and working farther from urban centers and consuming more undeveloped land. Urban job centers have decentralized to the suburbs, and new housing tracts have moved ever deeper into agricultural and formerly forested areas.

The desire has been for a more pleasant lifestyle. The unintended side effects have included:

- Increased infrastructure costs in the form of new schools, new roads, new sewers, etc.
- Strains on municipal services as the cost of services, particularly public education, incurred from many residential areas may exceed the taxes paid by those properties.
- Increased traffic as residences, jobs, retail centers, and recreational opportunities spread farther from each other.
- Increased air and water pollution.
- Ecological damage to ecosystems such as fields and forests that have been fragmented by subdivisions.
- An increased sense of congestion as a community transforms from rural to urban.
- A decline in the urban tax base, which leads to higher taxes, which lead to more urban flight.

3-3 Future Land Use Needs

Consider how much our community and community design models have changed in the past 50 years, and even in the past 15 years:

- People no longer concentrate their activities in one community.
- Community professionals, merchants, and workers may not be residents.
- Residents spend most of their time outside of their community.
- There is probably more than one breadwinner in a household.
- The number of jobs we have in a lifetime has changed.
- Shopping patterns and the retail industry have changed.
- There are now more regional recreation opportunities.
- Technology and communications have expanded our boundaries and focus.
- Activities now have a regional and global context and connections.

These changes can blur distinctions between communities, destroying characteristics that make them unique and give them the sense of "place." The Rhode Island Economic Policy Council has warned of a "creeping sameness" that can "sap the vitality" of communities as their local economies evolve and take on more of these characteristics. ((RIEPC, *Soul*:1)) It doesn't have to happen to Rhode Island, the Policy Council avers.

Making connections between land use planning and the new economy, state leadership groups including the Policy Council, Grow Smart Rhode Island, and the Governor's Growth Planning Council have promoted maximizing Rhode Island's physical assets and promoting the concept of quality of place.

In 2001, the Policy Council issued a report ((RIEPC, *Soul*)) organizing ten strategies for a successful Rhode Island economy under four themes: places, people, clusters and connections. Five of them had clear land use implications:

- Develop economic niches based on place.
- Nurture vibrant, walkable, and authentic places.
- Promote sustainable use of Narragansett Bay.
- Move people better.
- Move goods better.

Developing and maintaining high quality places is critical to Rhode Island's economic future. As the Policy Council has said, "authentic places" are what distinguish Rhode Island from other areas where industries and workers might locate and stay. They contribute to a quality of life offering a diverse culture, ample recreational opportunities, a sense of history, and a variety of housing and lifestyle choices, as well as easy access to the major metropolitan areas of the Northeast. They are as much a part of the business climate as tax incentives for research and development or good labor-management relations. In this respect, sound land use planning and implementation to protect quality of place are as much a key to Rhode Islanders' shared economic success as other strategies and investments.

Residential Land Needs

Rhode Island in total measures 699,721 acres. Twenty percent, or 138,684 acres, is presently developed for residential use. This estimate is conservative relative to the amount of land "committed" to residential use, because the 1995 Land Use/Land Cover analysis on which it is based was likely to have counted the undeveloped portions of large residential lots committed to low density residential usage as an "undeveloped" land use category (woodland, wetland, etc.).

From data gleaned from local Comprehensive Plans, Rhode Island cities and towns have committed 471,872 acres for residential use in the future – about 68 percent of Rhode Island! The densities planned for these new homes will obviously shape land use patterns and set trends for years to come.

An analysis using the R.I. Geographic Information System (RIGIS) compared the densities anticipated from Future Land Use Maps in the Comprehensive Plans with existing residential use, i.e., as of 1995. This is summarized in Table 121-03(7). The table is based on the following definitions of five categories of residential density (land per dwelling):

Low density — Greater than two acres.
Medium low density — One to two acres.
Medium density — One-quarter acre to one acre.
Medium high density — One-eighth to one-quarter acre.
High density — Less than one-eighth acre.

Table 121-03(7):
RESIDENTIAL DENSITIES: EXISTING (1995) AND ANTICIPATED

Density Category	Acres (1995)	% Total Acres Developed as Residential (1995)	Acres (from Future Land Use Maps)	% Total Acres Developed as Residential (Future)
Low	8,236	6	180,017	38
Medium Low	10,707	8	146,449	31
Medium	53,522	39	83,924	18
Medium High	45,730	33	45,089	10
High	20,489	15	16,393	3
Total	**138,684**		**471,872**	

Note: Approximately 12 percent of the existing residential acreage (16,190 of 138,684 acres) in the state is located outside of the areas identified as residential on the Future Land Use Maps.

Source: Statewide Planning Program (RIGIS)

To put these figures another way, 333,188 acres, or 71 percent of the state's land reserved for housing in the future, have not yet been developed as housing. Of these 333,188 acres:

- 52 percent is planned for low density.
- 41 percent is planned for medium low density.
- 9 percent is planned for medium density.
- Medium high density and high density are expected to decrease.

Thus, 93 percent of land zoned residential that has not yet been developed for housing is planned for low density or medium low density development (one acre or more), while no new high density or medium high density development (one-quarter acre or less) is planned other than to replace existing housing at those densities, at a rate less than one for one.

Based on analyses of trends in household size and demographic projections of household formations (Table 121-03(5)), the number of year-round occupied housing units is projected to range as follows over the projection period: 2010, 404,911 to 421,438; 2020, 416,135 to 432,982; and 2025, 420,711 to 437,946. ((SPP, Reference?))

In terms of number of *additional* units projected for each ten-year period, the minimum-maximum ranges are, for 2010, 3,513 to 13,014; for 2020, 11,224 to 11,544; and for 2025, 4,636 to 4,964.

If all residential units are distributed according to density patterns prevalent in Rhode Island in 1995 according to Statewide Planning's land use analyses, the residential *acreage* requirements will be the following: for 2010, 106,084; for 2020, 108,025; and for 2025, 109,264.

If the projected net growth in housing of 29,522 units (using the maximum estimates) is distributed in a density pattern that reflects 1995 zoning, the net additional residential acreage required would total 64,411 acres. Added to the existing 1995 residential acreage of 138,684, this would give a 2025 residential land use total of 200,095 acres – or a 46 percent increase!

While none of the above figures for housing growth and increase in residential acreage can be known with certainty, it can be stated with reasonable assurance that:

- Rhode Island can expect continued housing growth, with the pace of growth greatest in the 2010-2020 period, and

- The increase in residential acreage is likely to outpace housing growth by a substantial factor.

Land Needed for Economic Activities

Much of Rhode Island's land resources in theory are allocated to support a robust and growing economy. Economic activities are dependent, in one shape or another, on the availability of suitable locations. Although the locational requirements of many business sectors are a great deal different in the Information Age from what they were in the Industrial Era, a fundamental premise is that land will still be required for them.

The dependence on land resources is both *quantitative* and *qualitative*. Quantitative requirements may be estimated based on trends, formulas, and rules of thumb. Qualitative requirements add variables that may compound initial quantitative assessments. Both dimensions of need are changeable, and continuingly changing, in a rapidly evolving economy. This section attempts to provide, *based upon available projections and trends,* a baseline quantitative estimate of land needed in 2025 to accommodate economic activities. Qualitative assessment and an analysis of how the existing supply compares to future need will be addressed in subsequent parts of the plan.

A fundamental assumption in this analysis is that Rhode Island's economy and the employment opportunities it provides will continue to expand to meet the needs of its population for a high standard of living. That is the goal of the primary economic development element of the State Guide Plan, the *Economic Development Policies and Plan,* and all state economic policy. However, there are sectors that will contract in numbers due to productivity gains or outsourcing, and this trend will also be reflected in the analysis.

The estimation of land needs for economic activities through 2025 is based upon an update and expansion of an analysis contained in another element of the State Guide Plan, the *Industrial Land Use Plan*. ((SPP, *Industrial*)) The analysis incorporates the following parameters:

- Forecasts of employment in major private sectors of the economy based upon trend (regression) analysis incorporating actual employment (for 1980, 1990 and 2000) and available employment projections by the RI Department of Labor and Training (2010) and RI Statewide Planning Program (2020), as used in Table 121-03(2).

- Estimates of the relative proportions of different economic activities likely to be sited on industrial *vs.* commercial land, based upon sources quoted in the *Industrial Land Use Plan.*

- Estimates of employment density for the various sectors derived by Statewide Planning and other sources. No change in employment densities over time is presumed.

- A contingency factor, set somewhat arbitrarily at 20 percent, rather than a set reserve as used in *Land Use 2010* and the *Industrial Land Use Plan*.

Land Use 2010 ((SPP, *Land Use 2010*)) included a set acreage figure – 8,000 acres – as a reserve for future land use. For this analysis, the 20-percent contingency factor was substituted. This results in a slightly lower reserve figure (5,900 acres), but may be more in line with the maturing of the state's economy and continued "build-out" of its landscape.

These parameters are combined in a simple arithmetic formula to produce estimates of commercial and industrial land likely to be required in 2025 to accommodate economic activities and to meet forecasted employment levels. Table 121-03(8) provides the inputs and resulting estimates of land needed.

The analysis indicates that Rhode Island could need to devote up to 35,400 acres of its land (5.1 percent of total area) to support economic activities in 2025. This compares with 23,300 acres of land in commercial, industrial, or mixed use that existed in 1995, a 52 percent increase over that total.

It is important to understand what these figures represent and what they do not represent. They represent the total land area that is estimated to be needed on a statewide basis, based on the assumptions given, to support economic activities in 2025. The calculations are highly sensitive to the employment density assumptions, and to the contingency factor selected. The estimates look at *total* need at one point in the future, not *incremental* need in the intervening years, and they address only the demand side – of the 35,417 acres estimated to be needed in 2025, some 23,312 acres existed in 1995 in commercial, industrial, or mixed use. Assuming that that acreage continues to be dedicated to economic activity, the *net* need would be 12,105 acres.

At this point, no assumptions are made relative to the characteristics of supply that should be provided to meet this demand. Issues such as what proportion of the future need should be met by reuse of abandoned or underutilized commercial/industrial sites, rather than being met by development of new employment centers, are policy considerations not included at this stage. Also, the figures developed by the formula are trend-based, and no changes in economic or land use policy that would affect major shifts in sectoral composition or average employment densities are assumed.

Composite of Future Land Use Maps from the Local Comprehensive Plans

The Rhode Island Comprehensive Planning and Land Use Regulation Act of 1988 required that all cities and towns adopt a Future Land Use Map as part of the land use element of their Comprehensive Plans. The Future Land Use Map graphically portrays the future strategy and land use policy of the municipality. Zoning is required to be consistent with the municipality's Future Land Use Map, and zoning must be brought into conformity with the Future Land Use Maps within 18 months. For the

Table 121-03(8):
ESTIMATE OF LAND NEEDED FOR ECONOMIC ACTIVITIES, 2025

A	B	C	D	E	F	G		
	Projected Employment in 2025[1]	**Industrial Land Share (%) (*ILUP* except as noted)**	**Commercial/ Mixed Land Share (%) (100%-Col C)**	**Employment in Industrial Areas (Col. B x Col. C)**	**Employment in Commercial/ Mixed Areas (Col. B x Col. D)**	**Employment Density (employees/acre) (*ILUP* except as noted)**	**Required Acres (Industrial) (Col. E / Col. G)**	**Required Acres (Comm./Mixed) (Col. F / Col.G)**
Construction	22,801	100	0	22,801	0	5	4,560	0
Manufacturing	36,230	100	0	36,230	0	20	1,812	0
Transportation, Communication & Public Utilities	20,263	95[3]	5	19,250	1,013	18[3]	1,069	56
Wholesale & Retail Trade [2]	131,685	-	-					
Wholesale	36,447	75	25	27,335	23,810	6	4,556	3,968
Retail	95,238	0	100	0	95,238	20[4]	0	4,762
Finance, Insurance, & Real Estate	37,314	50	50	18,657	18,657	125	149	149
Services	252,960	60	40	151,776	101,184	30	5,059	3,373
TOTAL	**501,253**					**Subtotal (acres):**	17,205	12,308
						20% Contingency[5]:	3,441	2,462
						Total (Acres):	**20,647**	**14,770**
						TOTAL ALL CATEGORIES[6]:	**35,417**	
						1995 Land Use, Ind./Comm./ Mixed Acreage:	**23,312**	

———————————————

ILUP = Statewide Planning Program, *Industrial Land Use Plan* (2000).

1 Regression analysis of employment by major sector using 1980, 1990, and 2000 DLT data, and DLT (2010) and Statewide Planning (2020) projections.

2 Components estimated by applying "Retail" percentage from Statewide Planning transportation model projections to total 2025 Wholesale/Retail employment estimate from regression analysis.

3 Statistics are weighted averages derived using figures given in the *ILUP* for the three separate subsectors of this sector.

4 Estimate from Natelson Co., Inc. (2001).

5 *Land Use 2010* (1989) included an 8,000 acre "reserve" factor for industrial land. A smaller "contingency factor" was deemed appropriate for this analysis.

6 Acres required include 23,000+ acres in commercial/industrial/mixed use in 1995 and assume that new growth will be at the same employment densities as past trends.

purposes of the following analysis, Statewide Planning assumes that these maps represent generalized zoning for the cities and towns.

How do these projected land uses compare with what has been identified as the need statewide? First, a summary of the findings from the composite is presented in Table 121-03(9).

Table 121-03(9):
COMPOSITE OF FUTURE LAND USE MAPS – SUMMARY OF FINDINGS

Use type	Acres, from Future Land Use Maps	% of Total RI Land
Commercial	18,211	2.6
Industrial	26,426	3.8
Mixed Use	8,245	1.2
Residential	471,872	68.4
Total	**524,754**	**76.0**

Source: Statewide Planning Program

The Comprehensive Plans, in aggregate, zone/plan for 26,426 acres for industrial use, 18,211 acres for commercial use, and 8,245 acres for mixed use. With the projected need in 2025 being 20,647 acres zoned industrial and 14,770 acres commercial and mixed use (Table 121-03(8)), it appears that the need will be met by a comfortable margin. However, as indicated above, this assessment does *not* take into account the quality of the land programmed for future economic use, i.e., constraints to development such as ledge, proximity to wetlands, poorly drained soils, odd parcel sizes, etc.

Land Needed for Other Major Activities and Specialized Land Uses

In addition to future land needs for residential and basic economic activities, there are other major uses to be considered. These include open space and recreation, transportation, and specialized activities such as institutional uses, energy facilities, and waste treatment and disposal. For many of these functions, the issue is not as much an aggregate supply of land as it is the particulars of site requirements, and ensuring that impacts on other uses are avoided or minimized.

Open Space

Reserving an adequate quantity of land to protect and conserve important natural resources and to allow the public access to and enjoyment of the outdoors is addressed directly in the *Greenspace and Greenways* and the *Recreation, Conservation, and Open Space* elements of the State Guide Plan.

The *Greenspace and Greenways* plan (1994) established a goal, by 2020, of permanently protecting via acquisition and regulation an integrated system of open space resources encompassing one third of the state's land area. The *Recreation, Conservation, and Open Space* plan (2003) reiterated the goal of creating a connected greenspace and greenway system, but suggested that acreage goals and targets also be reviewed in light of the "rapid growth and continuing loss of greenspace" that the state experienced in the past few years. ((SPP, *SCORP*))

Data in the RIGIS identify approximately 292,000 acres, 42 percent of the state's total land area, as undeveloped in 1995. Of these, 77,000 acres (11 percent of the total land area) are identified as protected for recreation, conservation, or open space purposes. Counting an additional 111,000 acres of inland water and wetland areas brings the total of protected open area to approximately 28 percent of the state's land area. Based on this calculus, the *Greenspace and Greenways* plan's goal of protecting one third of the state's area may appear nearly accomplished. However, an important question for this plan is what amount of the approximately 42 percent of the state's land area that remains unprotected and undeveloped should be brought into the *Greenspace and Greenways* system.

Transportation

Transportation infrastructure was the primary land use on approximately 8,700 acres in 1995. This included approximately 6,500 acres for roads, 1,900 acres for airports, and 200 acres for railroads. The figure for roads is likely a considerable undercount, however, due to the nature of the 1995 land use study. As the study was based on aerial photo interpretation, most two-lane highways and local streets and roads were generally categorized and counted within the surrounding land usage.

Future transportation system components are the subject of several State Guide Plan elements, including *Transportation 2025 – The Long Range Ground Transportation Plan,* the *State Airport Systems Plan,* the *State Rail Plan,* and the *Waterborne Passenger Transportation Plan.* These plans indicate that the state's basic transportation infrastructure is largely in place, and the addition of major new highways and other facilities is not contemplated, other than periodic upgrading and expansion of what already exists.

While such upgrading and expansion (e.g., widening or addition of lanes on highways, new intermodal stations, airport expansion) could certainly require some additional land to be devoted to the transportation function, that quantity of land is expected to be fairly insignificant relative to the total land supply. Locational requirements and consequent impacts upon adjoining land uses are expected to be more significant considerations. That is certainly the case with facilities such as airports, where expansion could displace other uses, and where the effects can extend the airport's footprint.

Institutional

Institutional uses, such as government buildings, hospitals, libraries, schools, colleges and universities, and similar public facilities, occupied 8,700 acres in 1995. While much of the future growth needs for governmental and institutional uses may be accommodated on existing sites and campuses, some expansion of the land devoted to this category can be anticipated.

For example, within the last five to seven years, the Community College of Rhode Island has established new facilities in South Providence and has committed to a campus in Newport. Similarly, new elementary schools have been constructed on new sites in Cranston, South Kingstown, Providence, and several other communities. Westerly is building its middle school on a new site, and a number of other districts – Bristol, Chariho, and Tiverton – have recently entertained expansion proposals.

Private sector institutional land needs are harder to predict, but continued expansions by the state's hospitals and private colleges and universities are expected. Johnson and Wales University, Brown University, Providence College, Bryant College, the Rhode Island School of Design, the New England Institute of Technology, and Katherine Gibbs have all made substantial additions to their facilities during the last decade as enrollments grew. Many of these have been through the acquisition or conversion of existing structures, but some have occurred on new sites. Similarly, the state's hospitals have added facilities, generally within the confines of their established campuses, but sometimes by adding to them. While it is not known how seriously it is contemplated, talk of an entirely new hospital somewhere in northern Rhode Island periodically surfaces in the media.

State government facilities are a part of the institutional category, but, with the exception of correctional, educational, and judicial facilities, expansion has been tempered by two trends of the 1990s – deinstitutionalization and work force stabilization.

Deinstitutionalization has allowed many structures (and a sizable acreage of land in some cases) at state compounds such as Pastore Center, Ladd Center and Zambarano Hospital to be made available for other uses. (While the number of group homes have expanded dramatically, these tend to be considered and counted in land use statistics as residential, not institutional facilities.) Productivity gains coupled with constrained hiring practices have allowed the state's workforce to be reduced from approximately 16,500 in 1994 to 15,300 in 2003. This decline has reduced pressure for expanding state facilities.

State government facility needs have also traditionally been met in part through the lease of commercial office space from the private sector, meaning that the land area involved is considered in commercial use. Opportunities to consolidate and centralize some state government functions through adaptive reuse of underutilized state-owned structures were pursued in the 1990s, including areas of the Pastore Center for use by the Department of Labor and Training and the Department of Elderly Affairs. Such

reuse of existing structures and facilities to meet current and future needs lessens the need to commit additional land for public purpose.

Whether driven by capacity needs or a need or desire to upgrade facilities to meet contemporary standards, it is likely that the quantity of land devoted to the institutional category will continue to grow in the future. The amount of land likely to be required cannot be precisely predicted, but standards and siting criteria and/or market conditions that favor rehabilitation of existing sites over new construction will minimize the need for additional land. Overall, a conservative estimate for added land for the institutional category through 2025 might be on the order of a ten to fifteen percent increase – i.e., 870 to 1,300 acres.

Summary

Absent dramatic policy shifts, forecasts given earlier in this section indicate that on the order of 80,000 additional acres of developed land could be required for residential, industrial, commercial and other developmental needs through 2025, *if development continues at the densities and intensities of recent trends*. If these needs materialize as predicted, and if land protection efforts wane after the "one third" protection goal is attained (likely within the next five years), the state's landscape breakdown in 2025 could be on the order of 40 to 43 percent developed and 57 to 60 percent undeveloped, including 33 percent protected as open space, water and wetlands, and 24 to 27 percent unprotected, undeveloped land available for future use.

Protecting natural resources, including air and fresh, salt and groundwater, requires coordination to guide development at a level that will sustain both Rhode Island's population, economy, and desirable quality of life.